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الرياضيات

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مأثور

Stochastic Processes

العمليات العشوائية

Elementary probability & statistics :-

Probability is the study of experiments whose outcomes are not certain.

- Basic notions in set theory

The operations

1) Union

$$A \cup B: \{x: x \in A \text{ or } x \in B\}$$

2) Intersection

$$A \cap B: \{x: x \in A \text{ and } x \in B\}$$

3) Complement

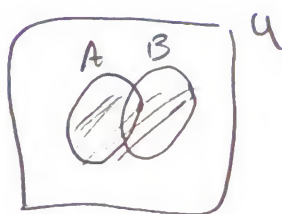
$$A^c: \{x: x \notin A \text{ and } x \in U\}$$

$\emptyset < A < U$, \emptyset is not empty set

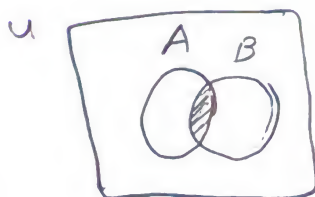
4) Difference

$$A - B: \{x: x \in A \text{ and } x \notin B\}$$

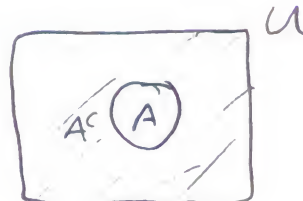
union



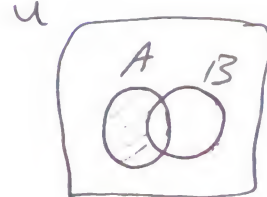
intersection



Complement



Difference




- An experiment is a well defined course of action with more than one possible outcome.

- A sample space for an experiment is the set S of all possible outcome of the experiment.

- A Sample point is an element of sample space.

Event: an event is a subset of a sample space, it is a possible outcome of a random experiment.

ex: $S = \{ (Y, Y, Y), (Y, Y, N), (Y, N, Y), \dots, (N, N, N) \}$



sample point = (Y, N, N)

event "2 yes, 1 no" = $\{ (Y, Y, N), (Y, N, Y), (N, Y, Y) \}$

Example: Suppose we test 3 light bulbs from a factory production line and record the result. when a tested bulb burns, we record a "S" for Success, otherwise we record "F" for failure. If all test bulbs burn, we record (SSS), if all bulbs fail to burn, we record (FFF), etc.. write the results

all bulbs burn	(SSS)	} S
one	(Sff) (fSf) (ffs)	
two	(SSf) (SfS) (fSS)	
all bulbs fail	(FFF)	